SECTION 01560

TEMPORARY CONTROLS

2. GENERAL

2.1 RELATED WORK SPECIFIED ELSEWHERE

A. Summary of Work: Section 01010

B. Project Coordination: Section 01041

C. Job Site Administration: Section 01043

D. Protection of Work and Property: Section 01545

2.2 LAWS

A. Requirements of federal, state and local statutes and regulations dealing with temporary controls described in this section shall be strictly adhered to by the Contractor.

2.3 CONSTRUCTION CLEANING

A. The Contractor shall keep the site of the work and other areas used by him in a neat and clean condition, and free from any accumulation of rubbish.

B. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the work site, and shall establish regular intervals of collection and disposal of such materials and waste.

C. Keep his haul roads free from dirt, rubbish, and unnecessary obstructions resulting from his operations.

D. Equipment and material storage shall be confined to areas approved by the Engineer.

E. Disposal of all rubbish and surplus materials shall be off the site of construction, at the Contractor's expense, all in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws.

2.4 AIR POLLUTION CONTROL

A. The Contractor shall not discharge smoke, dust or other contaminants into the atmosphere that violate the regulations of any legally constituted authority.

B. The Contractor shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent his operation from

producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity.

C. The Contractor shall comply with specific requirements of air quality control laws.

D. The Contractor shall be responsible for any damage resulting from any dust originating from his operations.

E. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Owner.

2.5 EROSION CONTROL

A. Contractor shall provide temporary erosion control work shown in the plans, required by state or local agencies during the life of the contract. This work is intended to provide prevention, control, and abatement of water pollution/erosion within the limits of the project, and to minimize damage to the work, adjacent property, streams, and other bodies of water.

B. The Contractor shall coordinate this temporary water pollution/erosion control work with the permanent drainage and erosion control work that may be specified in the Contract to the extent practicable to ensure that effective and continuous water pollution/erosion control is maintained during the construction of the Project.

C. Clearing and grubbing operations shall be so scheduled and performed that grading operations and permanent erosion control features can follow immediately. If the project conditions do not permit this scheduling, temporary water pollution/erosion control measures will be required between successive construction stages.

D. The area of excavation, borrow, and embankment operations in progress will be limited commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other permanent erosion control measures current according to the accepted schedule.

E. If the Engineer determines that water pollution and/or erosion could occur due to seasonal limitations, the nature of the material, or the Contractor's progress, temporary water pollution/erosion control measures shall be taken immediately.

F. The Engineer may require the Contractor's operations to be scheduled so that permanent erosion control features will be installed concurrently with or immediately following grading operations.

G. Compliance with the requirements of this section shall not relieve the Contractor from his responsibility to comply with other provisions of the contract.

2.6 NOISE CONTROL

A. Comply with state and local requirements as to allowable noise levels during construction.

B. Equip all internal combustion engines in vehicles and construction equipment with effective mufflers.

C. Prevent noise disturbance to adjoining property owners and the public.

D. Unless otherwise indicated elsewhere in the Project Manual, construction operations shall be restricted between the hours of 7:00 AM and 7:00 PM without specific approval by the Owner except in emergencies.

2.7 SANITARY PROVISIONS

A. The Contractor shall provide and maintain in a neat and sanitary condition such accommodations for the use of his employees and the Engineer as may be necessary to comply with the requirements and regulations of the agencies or organizations having jurisdiction over sanitary and health conditions and of other bodies or offices having jurisdiction thereover. He shall permit no public nuisances.

B. The Contractor shall establish a regular daily collection of all sanitary and organic wastes.

C. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away from the site in a manner satisfactory to the Owner and in accordance with all laws and regulations pertaining thereto.

2.8 CHEMICALS

A. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture.

B. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

C. Conform to requirements of the HSP.

D. Material Safety Data Sheets (MSDS) are required on all chemicals used during the construction process and shall be available for immediate access.

2.9 PROVISION FOR WATER COURSES

A. The Contractor shall provide for the flow of all water courses, sewers or drains, intercepted or disturbed by the Contractor during the progress of the work, and shall replace the same in as good condition as he found them or shall make such final provisions for them as necessary.

B. The Contractor shall not obstruct the gutter of any street, but shall use all proper measures to provide for the free passage of surface water.

C. The Contractor shall make provisions to take care of all surplus water, mud, silt, or other runoff pumped from excavations or resulting from sluicing or other operations, and shall be responsible for any damage, of whatever nature, resulting from his failure so to provide.

D. No direct payment shall be allowed for the above work. Payment for the cost thereof shall be included in the prices bid for the various items which comprise the improvement.

E. All work adjacent to or in the vicinity of streams, lakes, or such other water courses shall be accomplished in accordance with the requirements of the Departments having jurisdiction.

2.10 ARCHAEOLOGICAL OR CULTURAL RESOURCES

A. The Contractor is advised that construction work within this Contract is subject to the provisions of state and federal laws and regulations pertaining to the preservation of archaeological and cultural resources.

B. In the event that any archaeological or cultural resources are uncovered during the course of construction, all work shall cease until an inspection and evaluation of the site has been made by an archaeologist to insure that archaeological data are properly preserved. The Contractor shall notify the Owner who will in turn notify the proper authorities.

C. The Contractor should anticipate reasonable delays while the archaeological investigations are being made and should make allowance for these delays under the appropriate bid items. No additional compensation will be allowed.

* * * END OF SECTION * * *

SECTION 01590

FIELD OFFICES AND SHEDS

1. GENERAL

1.1 REQUIREMENTS SPECIFIED ELSEWHERE

A. Temporary Water: Section 01515

1.2 CONTRACTOR CONSTRUCTION BUILDINGS

A. Contractor shall furnish at his own expense all offices, sheds, storage buildings shelters and protection for workers that he may require for his own use or may deem fit.

* * * END OF SECTION * * *

SECTION 01650

TESTING

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Testing Laboratory Services: Section 01410

B. Inspection Services: Section 01420

C. Temporary Water: Section 01515

D. Contract Closeout: Section 01700

1.2 RESPONSIBILITY

A. Testing shall not be cause for claims for delay by the Contractor and all expenses accruing therefrom, shall be deemed to be incidental to the Contract.

B. The Contractor shall provide all materials, supplies and labor necessary to efficiently complete the testing (except water).

C. All power and utility bills shall be paid by the Contractor up to and including the day of final acceptance of the Contract by the Owner. If not paid, these charges shall be treated as claims against the Contractor.

D. If the Owner chooses to commence operations prior to final acceptance, the Owner will assume payment of all power and utility charges effective the day that operation is assumed by the Owner and notice is given in writing.

1.3 TESTING

A. Testing shall consist of individual tests and checks made on equipment intended to provide proof of performance of units and proper operation of unit controls together with such necessary tests whether or not described elsewhere in these Specifications to assure proper alignment, size, condition, capability, strength, proper adjustment, lubrication, pressure, hydraulic tests, leakage tests and all other checks deemed necessary by the Engineer to determine that all materials and equipment are of specified quality, properly situated, anchored and in all respects ready for use.

B. All gravity sewer pipe and pressure piping shall be tested as required by these specifications and applicable codes.

C. Tests on individual items of equipment, pipelines, vessels, structures, tanks, controls and other items shall be as described in various sections describing such items.

D. Testing will be done by the Contractor in the presence of an Inspector designated by the Engineer. Records of all official tests will be made by the Inspector.

E. During tests, the Contractor shall correct any defective work discovered or that is not in first class operating condition.

* * * END OF SECTION * * *

SECTION 01700

CONTRACT CLOSEOUT

1 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A Project Coordination: Section 01041

B Protection of Work and Property: Section 01545

C Testing: Section 01650

D Final Cleaning: Section 01710

E Project Record Documents: Section 01720

1.2 SUBSTANTIAL COMPLETION

A. Contractor:

1. After testing and startup, submit written certification to Engineer that Project or designated portion of Project is substantially complete.

2. Submit list of items to be completed or corrected.

B. Engineer will make an inspection after receipt of Contractor's certification, together with Owner's representative.

C. If it appears to the Engineer that work is substantially complete:

1. The Engineer may request of and the Contractor shall prepare and submit to Engineer, a list of items to be completed or corrected as determined by the inspection.

2. If the Engineer then considers the work to be substantially complete, the Engineer may, with the Owner's approval, issue a Certificate of Substantial Completion, with appropriate conditions, accompanied by a list of the items to be completed and corrected, as verified and amended by Engineer. Omission of any item from the list shall not relieve the Contractor from responsibility to complete all the work in accordance with the Contract.

3. The Owner will pay the Contractor for all portions of work as defined in the Engineer's Certificate of Substantial Completion.

4. Owner occupancy of Project or designated portion of Project:

   a. Contractor shall perform final cleaning in accordance with Section 01710.

5. Contractor shall complete all the work within the time designated in the Certificate, or if not so designated within a reasonable time.

D. Should the Engineer consider that work is not substantially complete:

1. He shall notify the Contractor, in writing stating reasons.

2. Contractor shall complete work and send second written notice to Engineer certifying that Project or designated portion of Project is substantially complete.

E. Warranties: See Information to Bidders page 7.

1.3 FINAL INSPECTION

A. The Contractor shall submit written certification that:

1. Contract Documents have been reviewed.

2. Work has been completed in accordance with Contract Documents.

3. Equipment and systems have been tested in presence of Owner's representative and are operational.

4. Project is completed, and ready for final inspection.

B. Engineer will make final inspection within a reasonable time after receipt of certification.

C. Should Engineer consider that work is complete in accordance with requirements of Contract Documents, he shall request Contractor to make project closeout submittals.

D. Should Engineer consider that work is not complete:

1. He shall notify Contractor, in writing, stating reasons.

2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Engineer certifying that work is complete.

3. Engineer will reinspect work.

1.4 REINSPECTION AND OVERTIME COSTS

A. In the case of overtime inspection and second inspections because of failure of work to comply with original certifications of Contractor, Owner will compensate Engineer for additional services as stated in said article and charge the Contractor for such fees at the Engineer's currently established billing rate.

B. Should it be considered necessary or advisable by the Engineer at any time before final acceptance of the entire work to make an examination of work already completed, by removing or tearing out any portion thereof, the Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to the fault of the Contractor or his Subcontractor, he shall defray all the expenses of such examinations and satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the additional cost of labor and materials necessarily involved in such examination and placement shall be paid to Contractor as provided elsewhere.

C. Should the Contractor elect to work more than eight (8) hours per day or more than five (5) days per week, or on holidays, during the course of the stated Contract time limit, all costs of engineering and inspection thus entailed will be charged to the Contractor, at the Engineer's current billing rate. Such charges will be billed directly to the Contractor by the Owner and said costs shall be a lien against the Contractor's work.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: To requirements of Section 01720

B. Guarantees and bonds required by these specifications: See Information to Bidders page 7.

C. Easement Release: Section 01545

D. At the close of the Contract the Contractor shall:

1. Pay all utility bills.

2. Remove all electrical, sanitary, gas, telephone, water, offices and any other temporary service equipment that may remain.

3. Arrange for transfer of electrical, and water accounts to the Owner's name.

E. Deliver evidence of compliance with requirements of governing authorities:

1. Certificates of Inspection:

a. Elevators.
b. Mechanical:

(1) As required by codes.

c. Electrical:
(1) State or city as required.
(2) Megger by Electrical Subcontractor.

1.6 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit final statement of accounting to Engineer.

B. Statement shall reflect all uncompleted adjustments:

1. Additions and deductions resulting from:

a. Previous Change Orders.
b. Cash Allowances.
c. Unit Prices.
d. Other Adjustments.
e. Deductions for Uncorrected Work.
f. Penalties and Bonuses.
g. Deductions for Liquidated Damages.

2. Unadjusted sum remaining due.

1.7 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit final application in accordance with requirements of General Conditions.

1.8 FINAL CERTIFICATE FOR PAYMENT

A. Engineer will issue Final Certificate in accordance with provisions of the Construction Agreement, Section 10 - Contract Price and Method of Payment.

B. Should final completion be materially delayed through no fault of Contractor, Engineer may issue a Final Certificate for Payment, in accordance with provisions of General Conditions and existing laws.

1.9 POST-CONSTRUCTION INSPECTION

A. Prior to expiration of the warranty as defined in the Information to Bidders, Engineer may make visual inspection of Project in company with Owner and Contractor to determine whether correction of work is required, in accordance with provisions of the Warranty Form.

B. Owner will promptly notify Contractor, in writing, of any observed deficiencies.

* * * END OF SECTION * * *

SECTION 01710

FINAL CLEANING

2. GENERAL

2.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Summary of Work: Section 01010

B. Project Coordination: Section 01041

C. Temporary Controls: Section 01560

D. Contract Closeout: Section 01700

E. Cleaning for Specific Products or Work: Specification Section for that Work

2.2 GENERAL REQUIREMENTS

A. Maintain premises and public properties free from accumulations of waste, debris, and rubbish caused by operations.

B. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.

C. Pipeline and work on public rights-of-way shall be kept cleaned up as specified in Division 2 for the work involved.

2.3 SAFETY REQUIREMENTS

A. Standards: Maintain project in accord with the applicable federal, state and local safety standards.

B. Hazards Control:

1. Store volatile wastes in covered metal containers, and remove from premises daily.

2. Prevent accumulation of wastes which create hazardous conditions.

3. Provide adequate ventilation during use of volatile or noxious substances.

C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws:

1. Do not burn or bury rubbish and waste materials on project site unless approved by local fire and air pollution authorities.

2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

3. Do not dispose of wastes into streams or waterways.

3. PRODUCTS

3.1 MATERIALS

A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

4. EXECUTION

4.1 DURING CONSTRUCTION

A. Execute cleaning to insure that grounds and public properties are maintained free from accumulations of waste materials and rubbish.

B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.

C. Remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.

D. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

4.2 FINAL CLEANING OF STRUCTURES

A. Employ experienced workmen, or professional cleaners, for final cleaning.

B. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.

C. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine finish.

D. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.

E. Broom clean paved surfaces; rake clean other surfaces of grounds.

F. Clean windows.

G. Replace air conditioning filters if units were operated during construction.

H. Clean ducts, blowers and coils, if air conditioning units were operated without filters during construction.

I. Maintain cleaning until project is occupied by Owner.

4.3 FINAL CLEANUP OF PIPELINES

A. Final cleanup work shall be completed as closely behind the construction work as it is physically possible to do.

B. Unless otherwise specifically provided in writing only those portions of the completed work will be included in the partial pay estimates where, in the Engineer's opinion, the cleanup work has been satisfactorily completed.

C. Refer to specific sections for detail requirements for cleanup of pipelines.

4.4 GENERAL CLEANUP

A. Before final acceptance, the Contractor shall remove and obliterate, insofar as feasible, all objects or disturbances of the ground which mar the landscape and were caused by his operations, whether or not part of the improvement.

B. Rubbish, excess materials, temporary structures, and discarded equipment shall be removed and disposed of.

C. Temporary haul roads shall be scarified and bladed to blend with surroundings.

D. Remove snags, down trees, brush, and stumps.

E. Fill holes and grade to smooth land contours. Shape ends of cuts and fills to fit adjacent terrain.

F. Hand rake disturbed areas to remove loose objects including rock and clods in excess of two inches in any dimension.

G. Sweep pavement, curb and gutter, sidewalks and driveways.

* * * END OF SECTION * * *

SECTION 01720

PROJECT RECORD DOCUMENTS

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Project Coordination: Section 01041

1.2 MAINTENANCE OF DOCUMENTS

A. Maintain at job site, one copy of:

1. Contract Drawings.
2. Project Manual.
3. Addenda.
4. Change Orders.
5. Other Modifications to Contract.
6. Field Test Records.

B. Store documents as appropriate, apart from documents used for construction.

C. Provide files and racks for storage of documents.

D. Maintain documents in clean, dry, legible condition.

E. Do not use record documents for construction purposes.

F. Make documents available at all times for inspection by Engineer and Owner.

1.3 RECORDING

A. Do not permanently conceal any work until required information has been recorded.
B. Keep documents current.

C. Contract Drawings: Legibly mark to record actual construction:

1. Depths of various elements of foundation in relation to variances from plan.

2. Horizontal and vertical location of underground utilities and appurtenances and references to permanent surface improvements.

3. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.

4. Field changes of dimension and detail.

5. Changes made by Change Order or Field Order.

6. Details not on original Contract Drawings.

D. Specifications and Addenda: Legibly mark up each Section to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.

2. Changes made by Change Order or Field Order.

3. Other matters not originally specified.

1.4 SUBMITTAL

A. At completion of project, deliver record documents to Engineer.

B. Accompany submittal with transmittal letter, in duplicate, signed by the Contractor, or his authorized representative.

* * * END OF SECTION * * *

TECHNICAL SPECIFICATIONS
DIVISION 2

SECTION 02010

SUBSURFACE INVESTIGATION

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

A. Job Site Administration: Section 01043
B. Inspection Services: Section 01420

1.2 QUALITY ASSURANCE

A. The Contractor shall readjust work performed that does not meet technical or design requirements.

B. The Contractor shall make no deviations from the Contract Documents without specific and written approval of the Owner.

C. The Contractor shall be responsible for obtaining approval from responsible agency or property owner before performing any exploratory excavations.

* * * END OF SECTION * * *

SECTION 02110

SITE CLEARING

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

A. Excavating, Backfilling and Compacting for Utilities: Section 02222

1.2 PROTECTION

A. Streets, roads, adjacent property and other work to remain shall be protected throughout the work.

1.3 MEASUREMENT AND PAYMENT

A. All work included in this section shall be incidental to other portions of the work.

2. PRODUCTS

2.1 MATERIALS

A. Materials shall be at the Contractor's option.

3. EXECUTION

3.1 CLEARING

A. Clearing work shall be performed within the confines of the area indicated on the Drawings, or in the Specifications.

B. Debris resulting from said clearing shall be disposed of by the Contractor and the right-of-way cleaned up in a neat and workmanlike manner.

C. No trees or shrubbery in public right-of-way shall be cut except by approval of the Engineer.

3.2 DAMAGED VEGETATION

A. Neatly trim turn limbs and trunk and severed roots.

B. Apply wound paint to above-ground wounds.

C. Remove and replace in kind all vegetation damaged extensively.

3.3 DISPOSAL

A. Contractor shall comply with all laws and rules that govern burning and shall secure necessary permits.

B. When burning is permitted, it shall be done under the constant care of competent watchmen such that surrounding property or vegetative cover is not damaged.

C. Contractor may sell any saleable material.

D. Material not burned or sold shall be hauled to a disposal site secured by the Contractor at his expense.

* * * END OF SECTION * * *

SECTION 02222

EXCAVATING, BACKFILLING AND COMPACTING FOR UTILITIES

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

A. Subsurface Investigation: Section 02010

B. Site Clearing: Section 02110

C. Water Lines: Section 02660

D. Section 02760: Existing Utilities/Facilities-Underground and Overhead

1.2 CLASSIFICATION

A. All excavation is unclassified unless separate bid item is included in bid form.

B. The terms earthwork or excavation include all materials excavated or removed regardless of material characteristics.

C. The Contractor shall make his own estimate of the kind and extent of materials which will be encountered in the excavation.

1.3 QUALITY CONTROL ASSURANCE

A. Soils and Backfill: Moisture density standard ASTM D1557 or AASHTO T-180 method unless otherwise specifically approved.

B. In-place Density Determination: Sandcone method ASTM D1556 or Nuclear method ASTM D2922.

C. Classification of Soils: ASTM D2487.

D. Quality control monitoring of subgrade backfill and embankment materials and construction by certified independent laboratory secured and paid for by the Contractor.

1.4 SUBMITTALS

A. Import backfill gradation and moisture density compaction curve test reports.

B. Embankment and native backfill materials gradations and moisture density standards curve test reports.

C. Certification of gradation and compliance with referenced standards and moisture density standards test reports.

D. Density test results in approved format.

E. At any time the Contractor shall change the source and/or stockpile from which materials are obtained, certificates of gradation for these new sources will also be required. The Contractor shall make allowances in his unit prices bid for these items to cover expenses incurred in having this certification made and no additional compensation will be allowed.

F. During construction, the Owner may elect to have further gradation testing completed on the materials being furnished by the Contractor. This testing will be at the expense of the Owner, however, the Contractor shall provide material samples as may be necessary to complete this testing and these material samples will be furnished from material available on the job site or from the Contractor's source and/or supplier.

2. PRODUCTS

2.1 BACKFILL MATERIALS

A. These materials shall be native materials and as described in this section.

2.2 BEDDING MATERIAL

A. Bedding for Rigid Conduits: Bedding material shall consist of clean, granular, well graded screened or crushed sand and gravel material conforming to the following gradation when tested in accordance with ASTM D422:

Sieves Size Square Opening	Percent Passing by Weight
3/4 inch	100
3/8 inch	95 - 100
No. 8	0 - 10
No. 200	0 - 3

B. Bedding for Flexible Conduits: Bedding material shall be a clean screened or crushed sand/gravel mixture free from organic matter and conforming to the following gradation when tested in accordance with ASTM D422:

Sieves Size Square Opening	Percent Passing by Weight
3/4 inch	100
3/8 inch	70 - 100
No. 4	55 - 100
No. 10	35 - 95
No. 20	20 - 80
No. 40	10 - 55
No. 100	0 - 10
No. 200	0 - 3

C. Minimum sand equivalent shall be 35 in accordance with ASTM D2419.

2.3 BACKFILL GRAVEL

A. All backfill material to be furnished under this Contract shall consist of naturally occurring screened sand or crushed gravel.

B. Be essentially free from wood waste or other extraneous or objectionable materials.

C. Shall have such characteristics of size and shape that it will compact readily and shall meet the following test requirements:

Stabilometer "R" Value	72 min.
Swell Pressure	0.3 psi max.
Maximum Particle Size	6 in.
Passing 1/4" Sq. Opening	25% min.
Passing No. 200 Sieve	10% max.
All percentages are by weight	
% Passing No. 200 Sieve	
Dust Ratio: % Passing No. 40 Sieve	2/3 max.
Sand Equivalent (ASTM D2419)	30 min.

D. Backfill gravel material retained on a 1/4-inch square sieve shall contain not more than 0.20% by weight of wood waste.

E. The Contractor shall provide the Engineer with a certificate of gradation or sieve analysis from a qualified testing laboratory for backfill gravel furnished under this contract.

F. Tallying for pay quantities shall be as established by the Contractor and Engineer prior to construction.

3. EXECUTION

3.1 TRENCHING

A. Material shall be excavated from trenches and piled adjacent to the trench and maintained so that the toe of the slope of the spoil material is at least two (2) feet from the edge of the trench.

B. Material shall be piled in such a manner that will cause a minimum of inconvenience to public travel.

C. Free access shall be provided to all fire hydrants, water valves and meters, and clearance shall be left to enable the free flow of storm water in all gutters, conduits, and natural watercourses.

D. Ledge rock, boulders, or stones shall be removed to provide a minimum clearance of six (6) inches under and around the pipe.

E. Contractor shall keep excavations free of water.

F. Contractor is responsible for shoring in accordance with Cal-Osha requirements.

3.2 TRENCHING FOR WATER LINES

A. Trenches shall be dug to true and smooth bottom grades and in accordance with the lines given by the Engineer.

B. Trench widths shall not exceed 30 inches maximum or 1.5 times outside diameter of the pipe plus 18 inches whichever is greater. The minimum trench width shall be the outside diameter of the pipe installed plus 12-inches.

C. Standard excavation equipment shall be adjusted so as to excavate the narrowest ditch possible.

D. Depth of trenching for water mains shall be such as to give a minimum cover of 36 inches over the top of the pipe unless otherwise specified.

E. Deeper excavation may be required due to localized breaks in grade, or to install the new main under existing culverts or other utilities where necessary.

F. Where profile of pipeline and ground surface is shown on the Plans, pipeline shall be laid to elevation shown regardless of depth.

G. Excavation shall be to such depth that the minimum cover over the valve nuts shall be one foot.

H. The length of trench excavated in advance of pipe laying shall be kept to a minimum.

I. Trenches shall be overexcavated below the specified grade to provide for bedding material specified.

3.3 TRENCHING FOR SEWERS AND DRAINS

A. Trenches must be of sufficient width to permit proper jointing of the pipe and backfilling of material along the sides of the pipe.

B. Trench width at the surface of the ground shall be kept to the minimum amount necessary to install the pipe in a safe manner, ordinarily accomplished by sloping the trench sides to the angle of repose of the material encountered.

C. Trenches wider than the maximum specified may result in a greater load of overburden than the pipe is designed for, and consequently, if the maximum trench width is exceeded by the Contractor, the Contractor shall at his own expense, provide pipe of higher strength classification, or provide a higher class of bedding where necessary to assure that the pipe will not be overloaded.

D. The normal maximum permissible trench width, at the bottom of the trench and up to a point at the crown of the pipe, shall be 1.5 times the inside diameter plus 18 inches or 40 inches, whichever is greater.

E. Excavation for manholes and other structures shall be sufficient to provide a minimum of 12 inches between their outside surfaces and the sides of the excavation.

F. The length of trench excavated in advance of the pipe laying shall be kept to a minimum, and in no case shall it exceed 150 feet unless specifically authorized by the Engineer.

G. Trenches shall be excavated below the barrel of the pipe a sufficient distance to provide for bedding material specified.

3.4 PIPE FOUNDATIONS

A. Where the trench bottom is in a material which is unsuitable for foundation or which will make it difficult to obtain uniform bearing for the pipe, such material shall be removed and a stable foundation provided in accordance with Standard Detail entitled "Foundation Gravel and Backfill".

B. Proper preparation of foundation and placement of foundation material where required, shall precede the installation of all pipe. This shall include the necessary preparation of the native trench bottom and/or the top of the foundation material to a uniform grade so that the entire length of pipe rests firmly on a suitable properly compacted material.

C. Gravel to be used for foundation purposes shall be of a type and gradation to provide a solid compact bedding in the trench. Since trench conditions vary, foundation gravel requirements will change.

D. Neither approval or disapproval of the foundation material proposed by the Contractor shall relieve him of his responsibility for providing adequate pipe foundation and guaranteeing his work as elsewhere required by the Contract.

E. Unsuitable material for foundation purposes below the depth required for the specified bedding shall be removed and replaced with suitable foundation gravel.

F. Excavated materials shall be disposed of at an approved waste site and all costs involved in the excavating and wasting of this material shall be considered as incidental to the foundation item, except that excavation more than two (2) feet below the pipe invert shall be classified as extra excavation and paid for at the Extra Excavation unit bid price.

3.5 PIPE BEDDING

A. Placement of bedding material in the pipe zone shall be as specified in the section regarding the pipeline being constructed.

3.6 BACKFILLING

A. Pipe bedding and backfill to 6 inches over the top of the pipe shall be completed before backfilling operations are started.

B. The Contractor shall take all necessary precautions to protect the pipe from any damage, movement or shifting. In general, backfilling shall be performed by pushing the material from the end of the trench into, along and directly over the pipe so that the material will be applied in the form of a rolling slope rather than by side filling which may damage the pipe. Backfilling from the sides of the trench will be permitted after sufficient material has first been carefully placed over the pipe to such a depth as to protect the pipe.

C. Compaction equipment used above the pipe zone shall be of a type that does not injure the pipe.

D. Provide for the proper maintenance of traffic flow and accessibility as may be necessary.

E. Make adequate provisions for the safety of property and persons.

F. Temporary cribbing, sheeting, or other timbering shall be removed unless specifically authorized in writing.

G. Dewatering shall be continued until the trench is completely backfilled.

H. Brush, stumps, logs, planking, disconnected drains, boulders, etc., shall be removed from the material to be used for backfilling the trench.

I. Where original excavated material is unsuitable for trench backfill, backfill gravel shall be placed. The unsuitable material shall be removed to a disposal area. Backfill gravel shall be used for backfill only where original material is unsuitable and upon approval by the Engineer.

J. Where it is required that a blanket of select material or bank run gravel be placed on top of the native backfill, the backfill shall be placed to the elevations shown on the Plans, or to the elevation the Engineer may direct, and shall be leveled to provide for a uniform thickness of the selected material. Compaction of the native material shall be as required by the Owner and shall be performed prior to placing the select material except where the backfill is settled by the jetting method. In this case, the bank run material shall be placed before jetting. The top layer of material shall be then loosened by scarifying or other method and recompacted. Surface material shall be loosened to whatever depth is required to prevent bridging of the top layer, but shall in no case be less than 18 inches.

K. Backfill Gravel: Wherever a trench is excavated in a paved roadway, sidewalk or other area where minor settlements would be detrimental and where the native excavated material is not suitable for compaction as backfill, the trench shall be backfilled to such depth as the Engineer may direct with Backfill Gravel.

3.7 GENERAL COMPACTION REQUIREMENTS

A. Requirements of this section shall apply unless more or less stringent requirements are established by the local agency involved.

B. When working in an existing traveled roadway, restoration and compaction must be achieved as the trench is backfilled so as to maintain traffic.

C. The pipe bedding zone shall be compacted to 90%.

D. Trench backfill shall be mechanically compacted to 90% of maximum density except for trenches over 8 feet in depth.

E. In the case of trenches over 8 feet deep, backfill at depths over 4 feet may be compacted by either water settling or mechanical compaction. The top 4 feet of the trench line shall then be mechanically compacted to 90%.

F. In any trench in which 90% density cannot be achieved with existing backfill, the top 4 feet shall be replaced with backfill gravel mechanically compacted to 90%.

G. When working in areas outside of proposed traveled roadway or on easements, backfill compaction may be achieved throughout the entire depth of the trench either by mechanical compaction or by water settling. In any case where the fill cannot be brought to a visibly dry, firm, stabilized condition by water settling, all affected backfill shall be removed and replaced by backfill gravel mechanically compacted to 90% density.

3.8 MECHANICAL COMPACTION

A. Method of compaction shall be at Contractor's option.

B. The Contractor shall be responsible to provide the proper size and type of compaction equipment and select the proper method of utilizing said equipment to attain the required compaction density.

C. In place compaction tests may be made. Contractor shall remove and recompact material that does not meet specified requirements.

3.9 WATER SETTLING

A. The jetting method described in the following paragraphs shall be used unless otherwise approved by the Engineer.

B. Jets shall be inserted at not more than four foot intervals as measured in any direction throughout the entire width and length of the top of trench backfill. Penetration shall be to the elevation of the crown of the pipe, to native ground on side slopes, and/or to any of the preceding lift or lifts.

C. Jetting operations shall be completed as closely as is practicable to the pipe laying and backfilling operation.

D. In very deep trenches, the backfill shall be placed in two or more lifts and each lift be jetted separately.

E. The Contractor shall furnish all hose and equipment necessary for jetting. The size of the hose shall be such that it will provide 35 psi pressure at the discharge nozzle when jetting is being performed. The jet shall be a rigid iron pipe with a minimum diameter of one (1) inch, and of such length as may be necessary to fulfill the above requirements.

F. Where the backfill has been placed and traffic has compacted the surface, the Contractor shall loosen the top layer and recompact it.

G. Hydrant water may be utilized for jetting when hydrants or other sources of water are available for such purpose. Hauled jetting water may be utilized when hydrant water is not available. When hauled water is required, the tank truck and/or trailer shall meet all safety and licensing regulations and shall be provided with a pump of such size and capacity as to provide for a pressure discharge equivalent to that required for hydrant jetting.

* * * END OF SECTION * * *

SECTION 02510

ASPHALTIC CONCRETE PAVING

4. GENERAL

4.1 RELATED WORK SPECIFIED ELSEWHERE

A. Site Clearing: Section 02110

B. Excavation, Backfilling and Compacting for Utilities: Section 02222

4.2 REFERENCES

A. State of California, Department of Transportation (CALTRANS) - Standard Specifications for Road Construction and CALTRANS - State Materials Manual.

4.3 QUALITY ASSURANCE

A. Perform Work in accordance with CALTRANS Standard Specifications, except as otherwise indicated on Drawings.

B. Obtain materials from one source throughout.

4.4 SUBMITTALS

A. Materials List: List source and quality standard for all asphaltic concrete materials.

B. Certificates of Conformance: Asphalt and aggregated materials.

4.5 ENVIRONMENTAL REQUIREMENTS

A. Do not place asphalt when base surface temperature is less than 40 degrees F or when rain is imminent.

5. PRODUCTS

5.1 MATERIALS

A. General: Aggregate base, prime coat, paint binder and bituminous surface course shall comply with CALTRANS Standard Specifications, unless otherwise indicated.

B. Soil Sterilant: Poly-Bor-Chlorate by United States Borax, Monobor-Chlorate by United States Borax, Monobor-Chlorate by Occidental Chemical or equal.

C. Headers and Stakes: 2x6 nominal preservative treated douglas fir, except at curves provide laminated 1x6 nominal preservative treated douglas fir. Use hot dipped galvanized nails only.

D. Aggregates for Base Course: Comply with Section 26 of CALTRANS Standard Specifications, Class 2, 3/4-inch maximum size gradation.

E. Aggregates for Asphaltic Concrete: Comply with Section 39 of CALTRANS Standard Specifications, Type B, size gradations as indicated or required for paving class.

F. Asphalt Cement: Comply with Section 92 of CALTRANS Standard Specifications, Grade AR-4000, ASTM D946.

G. Liquid Asphalt: Comply with Section 93 of CALTRANS Standard Specifications, MC-70, ASTM D2027.

H. Asphaltic Emulsions: Comply with Section 94 with CALTRANS Standard Specifications, SS-1h.

5.2 ASPHALT PAVING MIX

A. Mix: Mineral aggregate uniformly mixed with bituminous binder in a central mix plant in accordance with CALTRANS Standard Specifications, Section 39, Type B. Mixing plant and transport and placement equipment shall comply with CALTRANS Standard Specifications, Section 39.

B. Binder Course: CALTRANS Standard Specifications, Section 39, 4.5 to 6 percent of asphalt cement by weight, 3/4-inch maximum aggregate.

C. Topping Course: CALTRANS Standard Specifications, Section 39, 5 to 7 percent of asphalt cement by weight, 1/2-inch maximum aggregate.

6. EXECUTION

6.1 PREPARATION

A. Subgrade:

1. Top 6-inches compacted to a minimum of 95% relative compaction.

2. Fine grading, checking, shaping, and compacting of subgrade shall be complete before start of asphaltic concrete Work.

B. Curbs and Gutters: Gutters shall be in place and cured prior to start of asphaltic concrete Work. Coordinate placement so aggregate base extends under curbs and gutters.

C. Soil Sterilant: Sterilize soil areas to receive asphaltic concrete paving. Apply soil sterilant in accordance with manufacturer's instructions and applicable environmental regulations. Take care to confine application to the areas to be paved.

D. Headers: Place headers with tops flush with finish asphaltic concrete surfaces. Back headers with stakes.

6.2 ASPHALTIC CONCRETE

A. Aggregate Base: Place and compact aggregate base material in accordance with CALTRANS Standard Specifications, Section 26, in 6-inch maximum layers, compacted to at least 95 percent relative density, ASTM D1557. Place aggregate base below curbs and gutters and portland cement concrete paving also, compacted to 95 percent at vehicular traffic and 90 percent at pedestrian-only traffic.

B. Paint Binder: Apply asphaltic emulsion to exposed edges and surfaces against which asphaltic concrete will be placed. Apply emulsion at rate of 0.10 gallons per square yard.

C. Asphaltic Concrete: Deliver and place asphaltic concrete mix in accordance with CALTRANS Standard Specifications, Section 39. Thicknesses of courses shall be as indicated on Civil Drawings. Place asphaltic concrete in maximum 1-1/2 inch lifts, measured after compaction.

D. Compaction: Compact asphaltic concrete in accordance with CALTRANS Standard Specifications, Section 39, using machine rollers. Compaction by vehicular traffic is prohibited. Do not displace or extrude pavement from position. Compact areas inaccessible to rolling equipment with machine-powered tamper. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.

6.3 TOLERANCES AND TESTS

A. Flatness: Maximum variation of 1/4-inch measured with 10 foot straight edge.

B. Compacted Scheduled Thickness: Within 1/4-inch of design thickness.

C. Variation from True Elevation: Within 1/2-inch.

D. Test: Flood test all paving to demonstrate positive drainage. No standing water shall remain 1-hour after test.

6.4 PROTECTION

A. After final rolling, prohibit all traffic on asphaltic concrete until mix has fully cooled and set. Minimum time, in all cases shall be 6 hours.

* * * END OF SECTION * * *